

REMARKS

Claims 1-4 are currently pending in this application. Claim 5 has been cancelled without prejudice and claims 6-14 have been cancelled without prejudice to the filing of one or more divisional applications.

Claim 1 has been amended to remove the phrase “and are dispersed differently.” Accordingly, no new matter is being added and the entry of this Amendment is respectfully requested. It is respectfully requested that these amendments be entered after final since they merely remove objectionable subject matter and do not require the Examiner to perform a further search.

Rejections under 35 U.S.C. § 112

The Examiner has rejected claim 5 under 35 U.S.C. § 112, first paragraph, arguing that claim 5 contains new matter because the specification does not disclose a relationship between the glossiness of the surface of the catalyst layer and the first and second hydrogen conductive polymer electrolytes that are different in size. While not necessarily agreeing with the Examiner, claim 5 has been cancelled. Accordingly, it is respectfully requested that the rejection under 35 U.S.C. § 112, second paragraph be withdrawn.

The Examiner has also rejected claims 1-5 under 35 U.S.C. § 112, second paragraph, as being indefinite with regard to the limitation “wherein the first and the second hydrogen conductive polymer electrolytes are different in size and are dispersed differently” in claim 1. The Examiner argues that it is unclear in what manner the first and second hydrogen conductive polymer electrolyte are dispersed differently, and whether the same final product would be obtained when they were each dispersed in the same way. While not necessarily agreeing with the Examiner, claim 1 has been amended to remove the phrase “and are dispersed differently.” Therefore, it is respectfully submitted that claim 1 and dependent claims 2-5 are in compliance with 35 U.S.C. § 112, second paragraph, and withdrawal of the rejection under 35 U.S.C. § 112, second paragraph is respectfully requested.

Rejections of Claims 1-3 and 5 under 35 U.S.C. § 102(b) as Anticipated by or under § 103(a) as Obvious over Watanabe

The Examiner has again rejected claims 1-3 and 5 under 35 U.S.C. § 102(b) as anticipated by or in the alternative under § 103 (a) as obvious over U.S. Patent No. 5,728,485 to Watanabe ("Watanabe") for the reasons set forth in the previous Office Action. Briefly, the Examiner argues that Watanabe discloses a polymer electrolyte fuel cell which includes an electrode that can be fabricated by two different kinds of catalyst carbon supports: the first catalyst carbon support being granular carbon and the second being carbon fibers. The Examiner also argues that the granular carbon particles supporting the catalyst are coated with a first electrolyte solution and dried, and then a second electrolyte solution is applied. Watanabe allegedly teaches that the amount of solid polymer electrolyte completely coats the support catalyst in the first coating step. Thus, the Examiner concludes that since the carbon fibers and particles are different in size, the size of the solid polymer electrolyte completely covering the carbon fibers and the granular carbon particles would also inherently be different in size. Applicants respectfully, yet strenuously traverse these rejections and the arguments in support thereof for the reasons set forth previously on the record, which Applicants rely upon in full, and for the additional reasons which follow.

First, Watanabe does not disclose or suggest two sets of carbon particles which each have a different electrolyte adsorbed thereon as claimed. In the present invention, each set of carbon particles adsorbs (has a coating of) a different hydrogen ion conductive polymer electrolyte. In contrast, Watanabe teaches that the support catalyst (carbon particle) is coated with two coatings of solid polymer electrolyte. (See, Watanabe, col. 5, ll. 12-33.) There is no teaching or suggestion in Watanabe of two different polymer electrolyte solutions which are adsorbed onto different sets of carbon particles.

Further, Watanabe does not disclose or suggest that the two hydrogen conductive polymer electrolytes are different in size. In the present invention, the electrolytes themselves are different in size (that is, the particle sizes of the electrolytes are different in size) before being applied to the two sets of carbon particles, and the electrolyte size is not determined by the carbon particle which is covered.

As discussed in pages 9-11 and 21-23 of the present specification, one method for adjusting the particle size of the polymer electrolyte includes adding a second solvent to a

polymer electrolyte that is dispersed in a first solvent. In this method, the particle size is adjusted by the altering the dielectric constant of the resulting solvent mixture and/or the concentration of the polymer electrolyte dispersed in the first solvent. (*See*, p. 9, ll. 6-16 of the Present Specification). By adjusting the particle size of the polymer electrolyte that are to be adsorbed to the carbon particles, it is possible to satisfactorily bring the polymer electrolytes and the catalyst particles into contact with each other and increase the reaction area of the catalyst. (*See*, p. 22, ll. 8-12 of the Present Specification).

It is respectfully submitted that the Examiner misinterprets the present invention. Placing an electrolyte on a support catalyst, which includes carbon fibers and particles which are different in size, does not create an electrolyte that is different in size – it merely creates electrolyte-coated support catalysts which are different in size. In other words, the size of the electrolyte (particle size) is independent of the support catalyst. Accordingly, Watanabe does not disclose or suggest that the two hydrogen conductive polymer electrolytes are different in size.

In light of the arguments presented above, it is respectfully requested that the present invention is not anticipated by and is not obvious over Watanabe. Therefore, it is respectfully requested that the 35 U.S.C. § 103(a) and § 102(b) rejections be reconsidered and withdrawn.

Rejections of Claims 1-3 and 5 under 35 U.S.C. § 102(b) as Anticipated by or § 103 (a) as Obvious over Inoue

The Examiner has again rejected claims 1-3 and 5 under 35 U.S.C. § 102(b) as being anticipated by or in the alternative under § 103 (a) as obvious over U.S. Patent No. 5,766,788 to Inoue (“Inoue”) for the reasons set forth previously. Essentially, the Examiner argues that Inoue discloses a polymer electrolyte fuel cell which includes an electrode which has carbon catalyst-loading particles which have two distribution peaks. The Examiner also argues that the platinum-carbon catalyst is pulverized to create catalyst with two different particle distributions – which is then impregnated with ion exchange resin.

Inoue allegedly teaches that the agglomerates of catalyst particles have two particle size distribution peaks which are composed of a plurality of catalyst particles and coated with polymer electrolyte (ion exchange resin). The Examiner concludes that because there are two particle size distribution peaks for the catalyst agglomerates, there would inherently be two particle size distribution peaks of the size of the polymer electrolyte covering the catalyst

agglomerates. The rejections and the arguments in support thereof are strenuously, yet respectfully, traversed for the reasons set forth previously on the record, which Applicants rely upon in full, and for the additional reasons which follow.

Inoue discloses agglomerates that have two particle size peaks. (*See*, Inoue, Abstract and col. 2, ll. 25-29). Agglomerates, as described in Inoue, are composed of a plurality of catalyst particles and the agglomerates are then coated with ion exchange resin. (*See*, Inoue, col. 3, l. 66 – col. 4, l. 3). In the present invention, the individual carbon particles may have two particle size peaks, and such a feature is not taught or suggested by Inoue. .

As described in detail above, the present invention comprises cases where the first and second hydrogen conductive polymer electrolytes are different in size. That is, there are at least two sets of carbon particles, each adsorbing a first and second electrolyte with the electrolytes being different in size (having different particle sizes). In contrast, when the same dispersed solution of Inoue is used for particles having two distribution peaks, the sizes of the polymer electrolytes will still be the same. Applicant fails to see where Inoue describes or suggests two different hydrogen ion conductive polymer electrolytes which are adsorbed onto different sets of carbon particles. Rather, Inoue uses one size of hydrogen conductive polymer electrolyte as implied by the language “...to coat the agglomerates with *the* ion exchange resin” (emphasis added). (*See*, Inoue, col. 2, ll. 28-29). Inoue does not teach or suggest the claimed size difference.

For all of these reasons, Inoue does not disclose or suggest the present invention. Therefore, the present invention is not anticipated by or obvious over Inoue and it is respectfully requested that the 35 U.S.C. § 103(a) and § 102(b) rejections based on Inoue be withdrawn.

Application No. 10/089,814
Reply to Office Action of August 25, 2005

In view of the above amendments and remarks, it is submitted that the claims fully comply with all formal requirements. In view of the preceding remarks it is respectfully submitted that the claims patentably distinguish over the prior art of record. Reconsideration and Allowance of this application are respectfully requested.

Respectfully submitted,

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(Date)

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